

Pectoral-Intercostal Fascial Plane Block in Chronic Post-Sternotomy Pain

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ABSTRACT

Persistent poststernotomy pain (PSP) is a well-known entity following cardiac surgery done with midline sternotomy. The severity of pain is usually mild to moderate in the majority of the patients. However, a small percentage of patients develop severe and persistent pain and need aggressive treatment. Our patient, a 63-year-old lady developed chronic severe parasternal pain following coronary artery bypass graft surgery. As multiple medications did not relieve her pain effectively, we did an ultrasound-guided pectoral-intercostal fascial plane block to which she responded with excellent and long-lasting pain relief. This is the first such case report of the use of this novel block technique for treating PSP.

Keywords: Coronary artery bypass graft, pectoral-intercostal fascial plane block, post-sternotomy pain, ultrasound

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INTRODUCTION

Persistent poststernotomy pain (PSP) is defined as persistent noncardiac thoracic pain 2-months after sternotomy.^[1] The majority of the patients following cardiac surgery report mild-to-moderate intensity pain, whereas only a small percentage of patients experience severe pain, which can present a big challenge to the physicians. In this case report, we describe the utility of a novel nerve block to treat PSP.

CASE DESCRIPTION

A 63-year-old lady was referred to our pain clinic 9-months after her coronary artery bypass graft (CABG) for severe persistent pain over the parasternal area and moderate-intensity pain in the surrounding area. She described her pain as sharp, tingling, stabbing, and throbbing in nature. She could recollect that her pain has

been there 1-month after the CABG. She was initially treated with oral paracetamol and tramadol by the cardiac surgeons before referring to us.

On numerical pain rating scale (NRS: 0 means no pain, 10 means worst imaginable pain), her pain score was 6 on an average, which increased to 8 on coughing. She had severe tenderness over the parasternal area, but no hyperalgesia. Her X-ray chest was within normal limits. We made a diagnosis of persistent poststernotomy pain (PSP) and put her on pregabalin 50 mg once daily, which was slowly titrated till 100 mg. Later, we introduced nortryptiline 5 mg and titrated up to 20 mg. In addition, she was prescribed tramadol 37.5 mg and paracetamol 325 mg combination tablets as needed. She reported around 40% relief in her pain in the next 8–10 weeks, but parasternal pain was persistent. We added a topical combination of gabapentin,

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lidocaine, capsaicin, and ketoprofen cream (Gabapax, Alteus Biogenics Pvt Ltd, India), but there was little benefit. Then, we discussed a trial of the pectoral-intercostal fascial plane block (PIFB) to which the patient agreed. As the patient was taking both aspirin and clopidogrel 75 mg each, we stopped clopidogrel 7 days before the procedure after consulting the surgeon, but continued aspirin.

After written informed consent, the patient was taken up for the procedure. Strict aseptic precaution was followed. Linear high-frequency probe was placed 3 cm lateral to the right side sternum and first needle insertion was at 2nd–3rd costal interspace [Figure 1a]. A 22 G 10 cm echogenic needle (Ultrplex-360, B Braun Melsungen, Germany) was inserted from cephalad to caudad and a 10 mL drug mixture was injected in the fascial plane between pectoralis major (PM) and external intercostal muscle (EIM) [Figure 1b]. Then, the 2nd injection was done in the 4th–5th intercostal space in a similar manner. The same 2 injections technique was repeated on the left side. In total, we injected 40 mL 0.375% ropivacaine with 8 mg dexamethasone. She developed reduced sensation to light touch around the parasternal area 30 min after the procedure, and her NRS was 1/10. She was discharged with pregabalin 50 mg twice daily and tramadol prn for pain. She described 80% pain relief in 1-, 3-months follow-up, and around 50% pain relief at 6-months follow-up.

DISCUSSION

PSP has been well documented in the literature. Studies have found that around 28% of patients following cardiac surgery reported PSP at 1-year with 13% and 4% of patients developing moderate and severe pain, respectively.^[2,3] The pathophysiology of PSP remains complex and common mechanism is the primary sensitization of the afferent peripheral neurons and later central sensitization. Pain

sensitization leads to the sprouting of nerves from damaged nerve endings and hyper-excitability leading to synaptic plasticity and wind-up phenomenon.

Our patient described both neuropathic and nociceptive pain characteristics. She was seen by both cardiologists and other causes like infection, or recurrent angina were excluded. Moreover, her pain was different from previous angina pain. Hence, we made the diagnosis of PSP and started treatment with recommended neuropathic medications and tramadol.^[4] She responded and got better to some extent; however, her parasternal pain was persisting. As medical management options got exhausted, we offered her nerve block (PIFB).

Coming to the interventional treatment for PSP, there is a paucity of data in the literature. The sternum is innervated by anterior cutaneous branches (ACB) of intercostal nerves, and that was the reason for us to choose PIFB. PIFB was first described by de la Torre *et al.* for analgesia of the sternal aspect following breast surgery.^[5] The block was done 2–3 cm lateral to the sternum and local anesthetic (LA) was deposited in the plane between PM and EIM targeting the ACBs. However, there is a lot of confusion with the nomenclature for this simple parasternal block, but ultimately the target is the same ACBs.^[6-8]

PIFB has been reported in the treatment of sternal fracture pain, and acute poststernotomy pain following CABG.^[7,9,10] To the best of our knowledge, this is the first report of PIFB in managing PSP. Still, there is no clarity on the optimal volume of LA, and the number of injections needs to be done for carrying out this block.

In conclusion, we were able to treat a patient with severe PSP following CABG successfully with this novel PIFB. The patient not only achieved long-lasting pain relief but also a better quality of life. This technique when done under ultrasound guidance is safe and should be considered in moderate–severe PSP not responding to medical management.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient has given her consent for her images and other clinical information to be reported in the journal. The patient understand that her names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

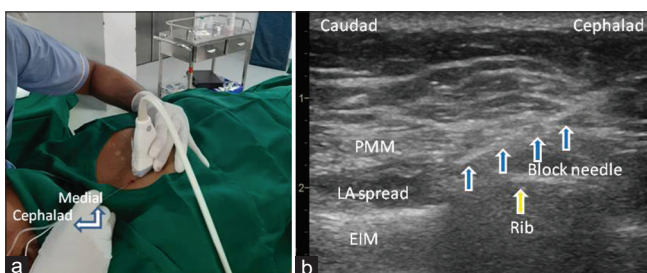


Figure 1: (a) Probe position and orientation. High frequency probe placed 3 cm lateral to midline in the parasternal area and block needle inserted cephalad to caudad. (b): Ultrasound-guided PIFB: Needle insertion from cephalad to caudad with tip in the plane between PMM and EIM showing the spread of LA in the IFP. Bold blue/white arrow indicates block needle, and bold yellow arrow indicates the rib/coastal cartilage. (PMM- Pectoralis major muscle, EIM - External intercostal muscle, LA - local anesthetic)

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Conflicts of interest

There are no conflicts of interest.

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